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November 21, 2008

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street SW.
Washington DC 20554

Re: Ex Parte Filing
WT Docket No. 07-293; IB Docket No. 95-91;
GEN Docket No. 90-357; RM-8610

Dear Ms. Dortch:

This is to confirm that on Thursday, November 20, the undersigned, together with Giselle Creeser, Lockheed Martin Corporation; Joseph Cramer, The Boeing Company; and Dr. Daniel G. Jablonski, Johns Hopkins Applied Physics Lab, had a conference call with Julius P. Knapp, Chief, Office of Engineering and Technology, regarding the position of Aerospace & Flight Test Coordinating Council and its Member Companies in the above-referenced proceedings.

The AFTRCC representatives distributed the materials attached. The points covered during the meeting are reflected in those materials, as well as in AFTRCC's earlier filings in the Dockets.

A copy of this ex parte statement is being submitted for the above-referenced proceedings.

Sincerely,

William K. Keane

Counsel for Aerospace and Flight Test Radio Coordinating Council

cc: Julius P. Knapp

Aerospace and Flight Test Radio Coordinating Council (AFTRCC)

Presentation to FCC Office of Engineering and Technology

November 20, 2008

Mobile devices can meet a 70 + 10 log(P) db limit

- By using better modulation techniques, pre-mod low-pass filters, and/or post-mod stagger-tuned micro-miniature band-pass filters

- One example of commercially available filter technology that can be adapted for low cost mass production of filters for WCS portable and mobile transmitters:

Surface Mount

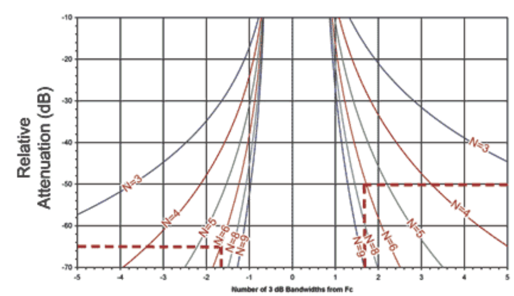
Filters

Microwave Filter Company, Inc. offers lumped constant filters for a broad range of selected frequencies, topologies and packages. Use of standard packages has enabled MFC to provide OEM and custom filters while keeping design time to a minimum.
http://www.microwavefilter.com/

Microwave Filter Company, Inc.
International Calls: (315) 438-4700
Toll Free: (800) 448-1666
An ISO 9001:2000 Registered Company

The curves below show the attenuation as a function of the normalized 3dB bandwidth. The following formula is used to predict the attenuation for a given number of sections:

$$\text{Number of normalized 3 dB bandwidths from center frequency, } BW_N = \frac{\text{Rejection Frequency (MHz)} - \text{Center Frequency (MHz)}}{\text{3 dB Bandwidth (MHz)}}$$



Note 60 dB per octave fall-off!

The AFTRCC 70 + 10 log (P) dB proposal is based upon

– AMT use of high gain antennas in noise-limited systems for operations in which all available link margin goes towards fade mitigation in this safety of flight application

– taking into account the shift in allowable OOBE from 43 + 10 log (P) in 2360 – 70 MHz to 70 + 10 log(P) in 2370 – 90 MHz helps the OOBE sharing situation -- but only by a few dB (3.8 dB)

Assumptions Favorable to WCS Used to Determine Impact of WCS on AMT Use

- Although WCS usage could be huge we consider that only the closest of the WCS transmitters are directly in the field of view of an AMT ground station antenna:
  - For base stations, propagation is r^2, but only one tower is in view of an AMT antenna at a time
  - For portables, propagation is r^2, but assume 10 dB window attenuation, and that only 3 devices are in view at a time
  - For mobiles, assume propagation is $r^{2.4}$, there is no additional attenuation, but that 10 devices are in view
- I/N = 0 dB reduces the maximum range at which an aircraft can be tracked in the direction of the WCS interference source by 30%
  - This is 8 dB higher than the aggregate I/N specified in Rec. M.1459!
- AMT system noise temperature is assumed to be 455 K, although systems without combiners can operate at 250K
- All of these assumptions are extremely favorable to WCS

The math:

$$\alpha\beta N[P_t G_t]A_{eff}/[4\pi r^x] = kT_{AMT}B_{AMT}$$

- Where
  - α takes into account decrease in OOBE emission level from 2360 – 2365 MHz
  - *B* is building attenuation
  - N = number of WCS emitters “seen” by AMT receive antenna
  - $P_t G_t$ is the WCS OOBE limit (e.g., 43 + 10 log (P) = $10^{-4.3}$), with G_t representing the WCS transmitter gain
  - A_{eff} = 4.67 m^2 is the effective area of an 8 foot diameter AMT receive antenna
  - *r* is the distance from the WCS source to the AMT receive antenna at which I/N = 0 dB
  - *x* is the assumed propagation constant
  - k is Boltzmann’s constant = 1.38 x 10^{-23} Joule/Kelvin
  - T_{AMT} = AMT system noise temperature (including combiner contribution; not all AMT systems use combiners) measured to be 455 Kelvin (250 Kelvin is appropriate for non-combiner systems, but is less favorable to WCS proponents)
  - B_{AMT} = AMT channel bandwidth = 5 MHz

Distance at which WCS devices double the noise floor of an AMT station, thus decreasing the maximum aircraft operating range by 30 percent

	43 + 10 LOG (P)	55 + 10 LOG (P)	60 + 10 LOG (P)	70 + 10 LOG (P)
Single Base station[1,2]	15.7 km	4.6 km	2.8 km	1.1km
3 Portables[2,3]	8.6 km	2.5 km	1.5 km	0.6 km
10 Mobiles[2,3]	8.2 km	2.9 km	1.9 km	0.9 km

[1]This assumes the OOBE is measured after the antenna, and that peak, rather than average value is used.

[2]A factor of 4 increase in the number of WCS transmitters simultaneously in view will double the distance numbers for base stations and portables, and almost double the distance for mobiles.

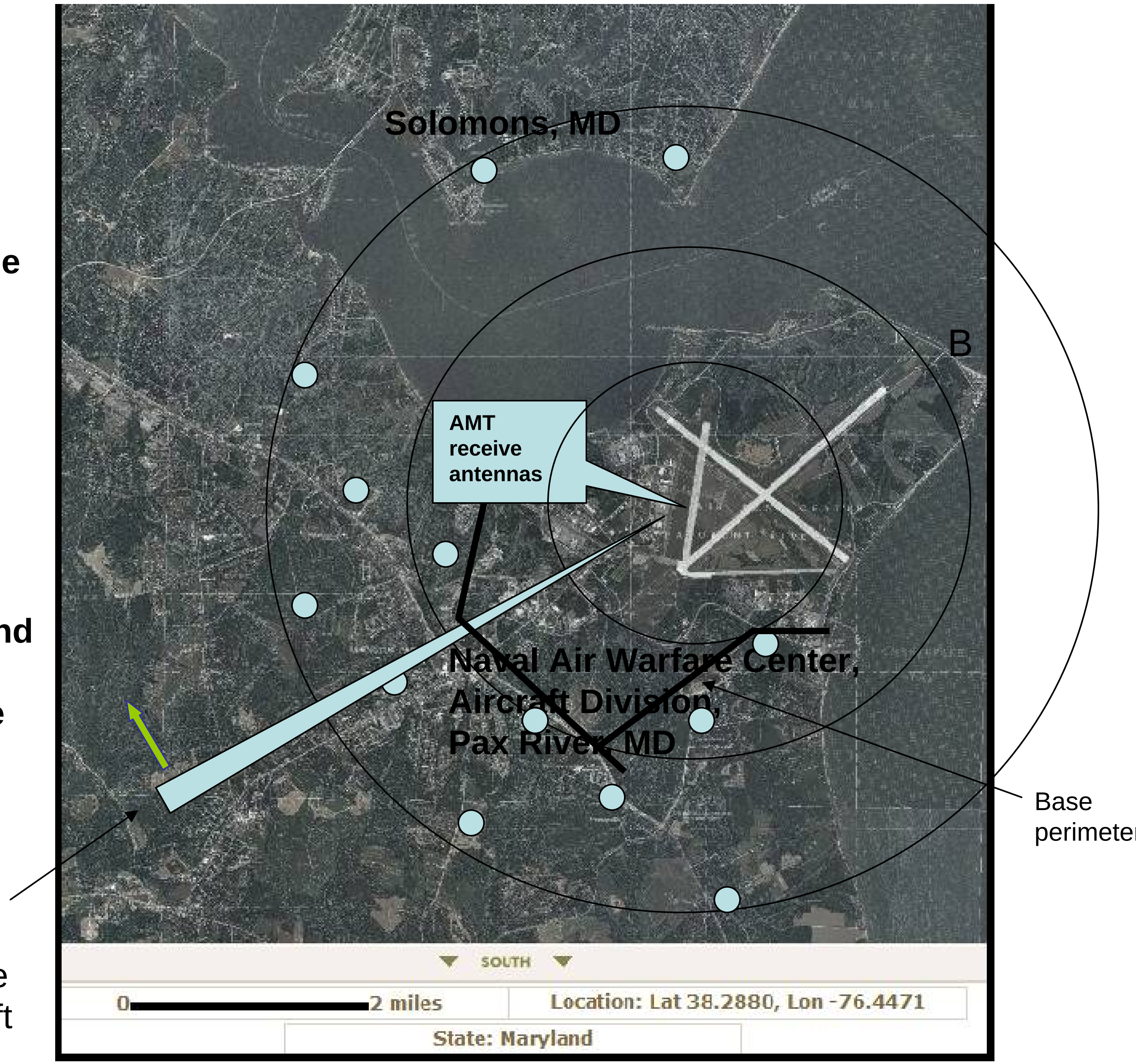
[3]This is the number of "closest-in" WCS devices simultaneously in view of the AMT receive antenna; This extremely low estimate is highly favorable to WCS proponents.

Impact to AMT operations

- Illustrative material that follows is for Patuxent River, Maryland (F/A-18, V-22, Presidential Helicopter, etc.), and Mid-Continent Airport, Wichita, Kansas (Cessna, Learjet, Bombardier, etc.)
- The effect of WCS deployment near these test centers is to dramatically reduce the airspace available for testing
  - Since aircraft routinely operate up to the maximum possible range from the AMT ground station, as permitted by fading conditions

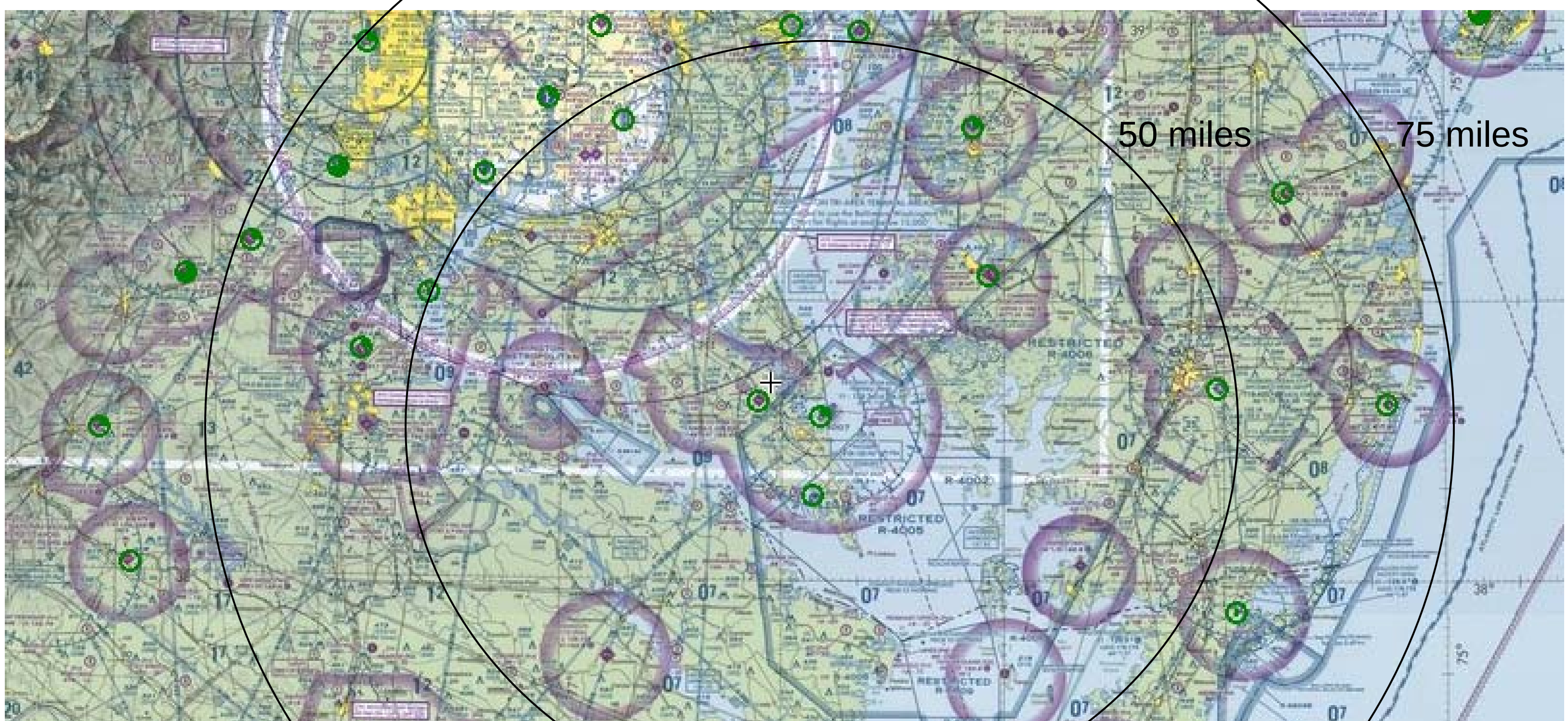
Grey circles are potential WCS tower-mounted base stations at approximately 1-mile separations within a 3 mile radius of Pax River AMT operations.

Interference budget will be dominated by these “close-in” towers and their associated portable and mobile WCS terminals.



Geography near Pax River, Maryland

Impact of WCS on AMT operations at Pax River, MD

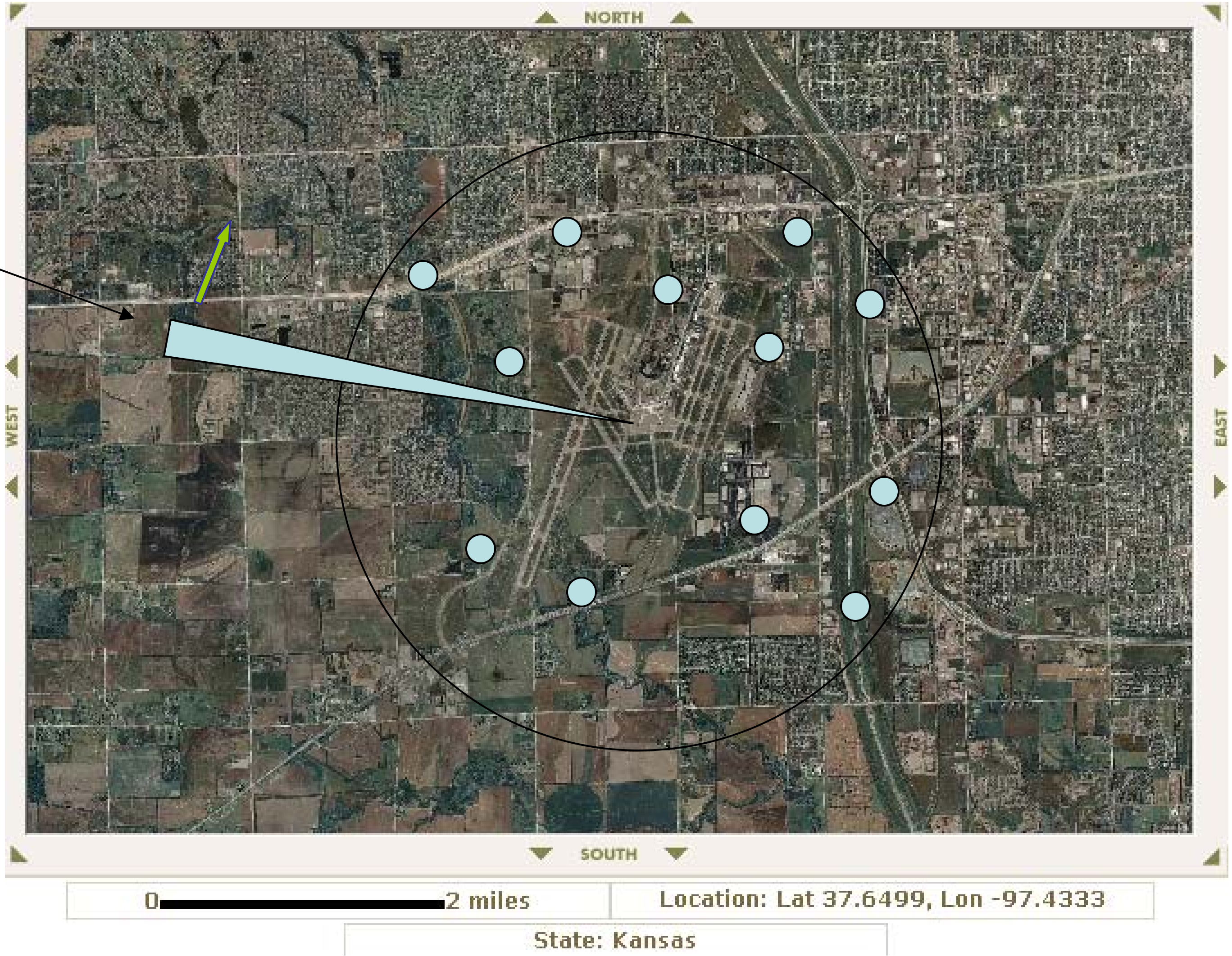


For a given value of signal to noise ratio, doubling the AMT noise floor shrinks the maximum telemetering distance from the aircraft by 30%. A 30% reduction is illustrated above by comparing the airspace usable for testing at distances from Pax River of 75 and 50 miles, respectively.

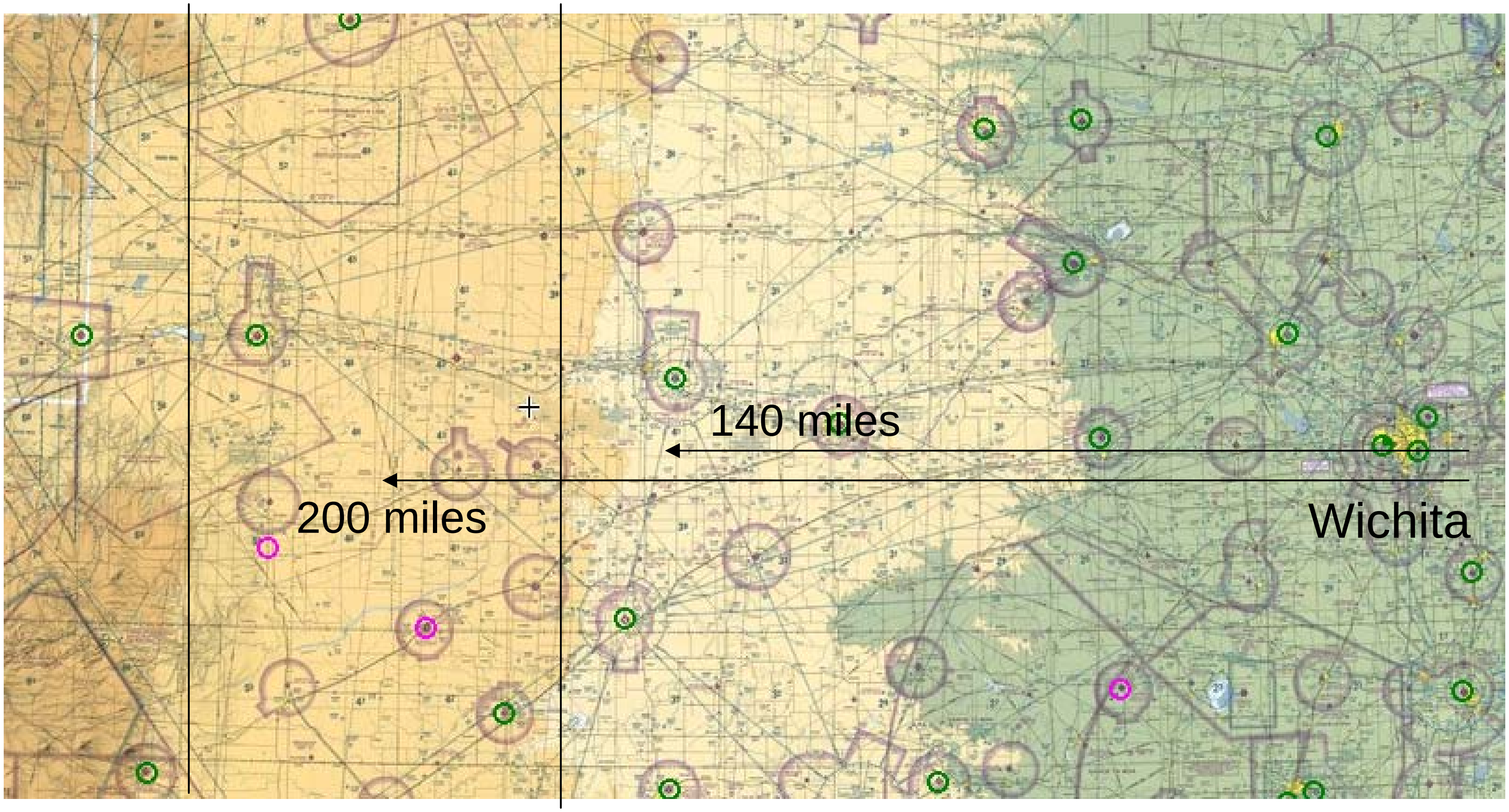
Impact to Flight Testing at Wichita, Kansas

Geography near Wichita, Kansas showing possible WCS base station tower placement within 2 miles of Mid-Continent Airport, where Cessna, Learjet, and others conduct their flight tests

Beam of AMT receive antenna as it cuts across WCS towers and their associated portable and mobile terminals while tracking an aircraft



Impact to AMT for maximum range operations at Mid-Continent Airport in Wichita, KS



Max AMT operational distance near Wichita of 200 miles is reduced to 140 miles if WCS placement doubles the AMT noise floor.